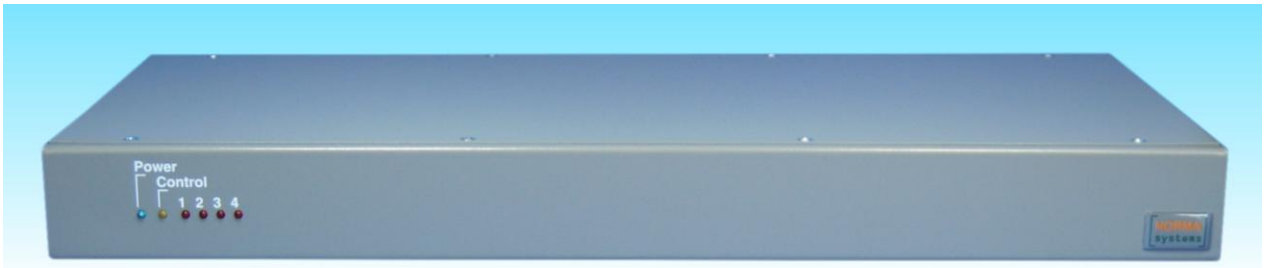
# Operating instructions

# Digital Video Sensor DMD - 4




PC-Software V3.xx

NORMA systems

Hard- and Software Development GmbH

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Dear Customer!

Thank you for your decision to use the Digital Video Sensor DMD-4 in your application.
We ask you to read thoroughly through the brief instructions, so that you can use the DMD-4 functions in an optimum way for your system.
Before installing the equipment, please read the safety instructions on page 35.

Check the included accessories for completeness:

- 1 x plug-in power supply 9V DC, 2.0A
- 2 x mounting brackets with screws for mounting in a 19“ rack
- 1x CAT5- Crossover Patch cable 2m
- 1 x 25 pin D-SUB soldering plug with cover and mounting hardware
- 1 x male / 1x female 9pin D-SUB soldering plug with cover
- 1 x CD-ROM with installation software
- 4 x self-adhesive equipment feet

Please contact your dealer directly, if any of the accessories should be missing!

## 1.0 Installation

### 1.1 PC Setup Dialog

The PC setup program for the DMD-4 video sensor uses the Windows systems 2000 /XP. The screen resolution should be set to at least 800 × 600 and the number of colors should be set to *True Color*.
To install the program from the included CD-ROM, run *Setup.exe* in the “DMD4” folder. Follow the program instructions and install the DMD-4 setup in the desired folder.

After the installation has been completed, start the program *DMD4* via the standard Windows menu *Start* ▸ *Program Files* ▸ *DMD4*. The setup program for the DMD-4 will be executed.

The program can be uninstalled via the Windows control panel menu “*Software*”.

### 1.2 DMD-4

Please connect the video signal of the video cameras to the BNC inputs 1 through 4.
By using the loop-through-Video outputs please and connect the outputs to the monitors, camera switches, etc.
After connecting the power supply the blue symbol “Power LED” lights up.
3-5 seconds after the sensor is initialized (the yellow LED is flashing) and ready for operation.
To configure the DMD-4, connect the Ethernet interface of the sensor to the LAN port of a PC or a laptop. Use the included crossover-cable for that purpose.
Important:
If you connect the DMD to a network hub/switch please use a 1:1-patch cable!
After starting the PC setup program, you can setup the DMD-4.

## 2.0 Technical Data

### Hardware:

Videosignale:
- 4 Video inputs, 1 Vp-p, 75 Ohm, with loop-through output
- Termination manually switchable

Sensor cells:
- 4 areas with over 6000 cells for each camera
- 8 scans/sec. each camera

Interfaces:
- RS232
- RS422/RS485 (galvanic separation)
- 10/100Mbit Ethernet
- 6 inputs (4x channel, global, DST-switch); passive protected
- 6x relay outputs ( 4x alarm, global, sabotage)
- 6 status-LEDs

Programm setup-memory:
- Firmware- and setup programming via Ethernet (RS232 optional)
- Integrated realtime clock, buffered

Housing:
- 19”-plug-in unit, 1 HE,
- Color: RAL 7037 , powder-coated

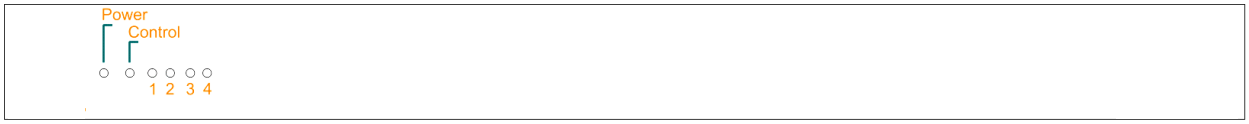
Power supply:
- External, 9... 12V DC / min. 1000mA

### Software:

- PC setup via ethernet interface, storing and downloading of parameters, password protection
- Transmission of camera picture to PC-setup program for positioning of sensor areas
- 4 freely configurable sensor areas per camera with a resolution of 6480 cells
- Object recognition up to 32 objects/camera and object tracking
- Analysis with perspective settings
- Dome Tracking: When detecting an object the sensor automatically calls presets of dome cameras
- Recognition / alarm notification of sabotage events
- Misc. filter function for detection of movements and for reduction of weather-dependent influences
- Integrated week-timer with a resolution in steps of 15-minutes; 4 time zones programmable with calendar function
- Selection for day/night settings via external contact
- Logical combination of sensor areas, alarm inputs and timer
- Triggering of one relay contact per camera and individual programming of serial command sequences for each area
- Live picture transmission and display of analysis data on PC setup program.

## 3.0 Pin assignment

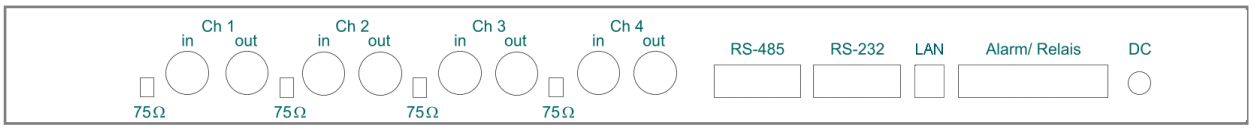
**Front side**:




LED´s:

| | | |
|---|---|---|
| Power: | Power supply | |
| Control: | Operation mode | |
| 1: | Alarm channel | 1 |
| 2: | -“- | 2 |
| 3: | -“- | 3 |
| 4: | -“- | 4 |

**Rear side**:

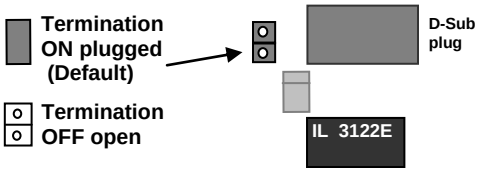



Assignment:

***RS485/ RS422 9-pol D-SUB female connector***

| | | |
|---|---|---|
| 1 | - | RS422 RxD/A (+) ; RS485 A |
| 2 | - | RS422 RxD/B (-) ; RS485 B |
| 3 | - | RS422 TxD/A (+) |
| 4 | - | RS422 TxD/B (-) |
| 5 | - | GND |
| 6 | - | Reserved |
| 7 | - | Reserved |
| 8 | - | Reserved |
| 9 | - | Reserved |

Using port as RS485:
External Bridge between Pin1 + Pin3, and Pin2 + Pin4
Termination resistor (Input; Pin 1+2):
Open the unit and change the jumper:




***RS232 9-pol D-SUB male connector***

| | | |
|---|---|---|
| 1 | - | nc |
| 2 | - | RXD |
| 3 | - | TXD |
| 4 | - | nc |
| 5 | - | GND |
| 6 | - | nc |
| 7 | - | RTS |
| 8 | - | CTS |
| 9 | - | nc |

Null-Modem - cable assignment
PC ⇔ sensor :

| | | | | |
|---|---|---|---|---|
| TxD | Pin 3 | ---------- | Pin 2 | RxD |
| RxD | Pin 2 | ---------- | Pin 3 | TxD |
| GND | Pin 5 | ---------- | Pin 5 | GND |
| RTS | Pin 7 | ---------- | Pin 8 | CTS |
| CTS | Pin 8 | ---------- | Pin 7 | RTS |

***Ethernet RJ45-plug 10BaseT/100BaseTX***

| | | |
|---|---|---|
| 1 | - | Rx + |
| 2 | - | Rx - |
| 3 | - | Tx + |
| 4 | - | nc |
| 5 | - | nc |
| 6 | - | Tx – |
| 7 | - | nc |
| 8 | - | nc |

***Alarm / Relais 25-pol D-SUB female connector***

| | | | | |
|---|---|---|---|---|
| 1 | - | External alarm input 1 | Channel 1 | |
| 2 | - | External alarm input 2 | Channel 2 | |
| 3 | - | External alarm input 3 | Channel 3 | |
| 4 | - | External alarm input 4 | Channel 4 | |
| 5 | - | External alarm input 5 | - DST switch | |
| 6 | - | External alarm input 6 | - Global contact | |
| 7 | - | GND | | |
| 8 | - | GND | | |
| 9 | - | GND | | |
| 10 | - | GND | | |
| 11 | - | GND | | |
| 12 | - | GND | | |
| 13 | - | GND | | |
| 14 | - | RELAY 1 | contact | |
| 15 | - | RELAY 1 | make contact | |
| 16 | - | RELAY 2 | contact | |
| 17 | - | RELAY 2 | make contact | |
| 18 | - | RELAY 3 | contact | |
| 19 | - | RELAY 3 | make contact | |
| 20 | - | RELAY 4 | contact | |
| 21 | - | RELAY 4 | make contact | |
| 22 | - | RELAY 5 | contact | sabotage relay contact |
| 23 | - | RELAY 5 | make contact | |
| 24 | - | RELAY 6 | contact | global relay contact |
| 25 | - | RELAY 6 | make contact | |

nc: not connected

***DC socket 2,1mm***

Center contact positive: +9...12V/ 1000mA

**Note:** Only galvanically isolated, stabilized power supplies with +9 ...+12 V may be connected to the unit!

## 4.0 Brief Description

DMD-4 is a digital video sensor for simultaneous monitoring of four camera signals (channels) for indoor and outdoor applications.
The sensor is also capable of detecting video picture changes under difficult light conditions.
The PC setup program interface of the DMD-4 allows comfortable setting of all sensor parameters.

First, the respective camera picture has to be transmitted from DMD-4 to the PC and displayed in an editor window. Each channel can be configured for four time zones. Using the PCs mouse you can now define four sensor areas per channel according to the local conditions.
For each sensor area there are extensive setting possibilities such as number of sensor cells, sensitivity, perspective, reset timer or alarm strings.

For recognition of sabotage events like spraying or other manipulations you can adjust a special sabotage analysis.

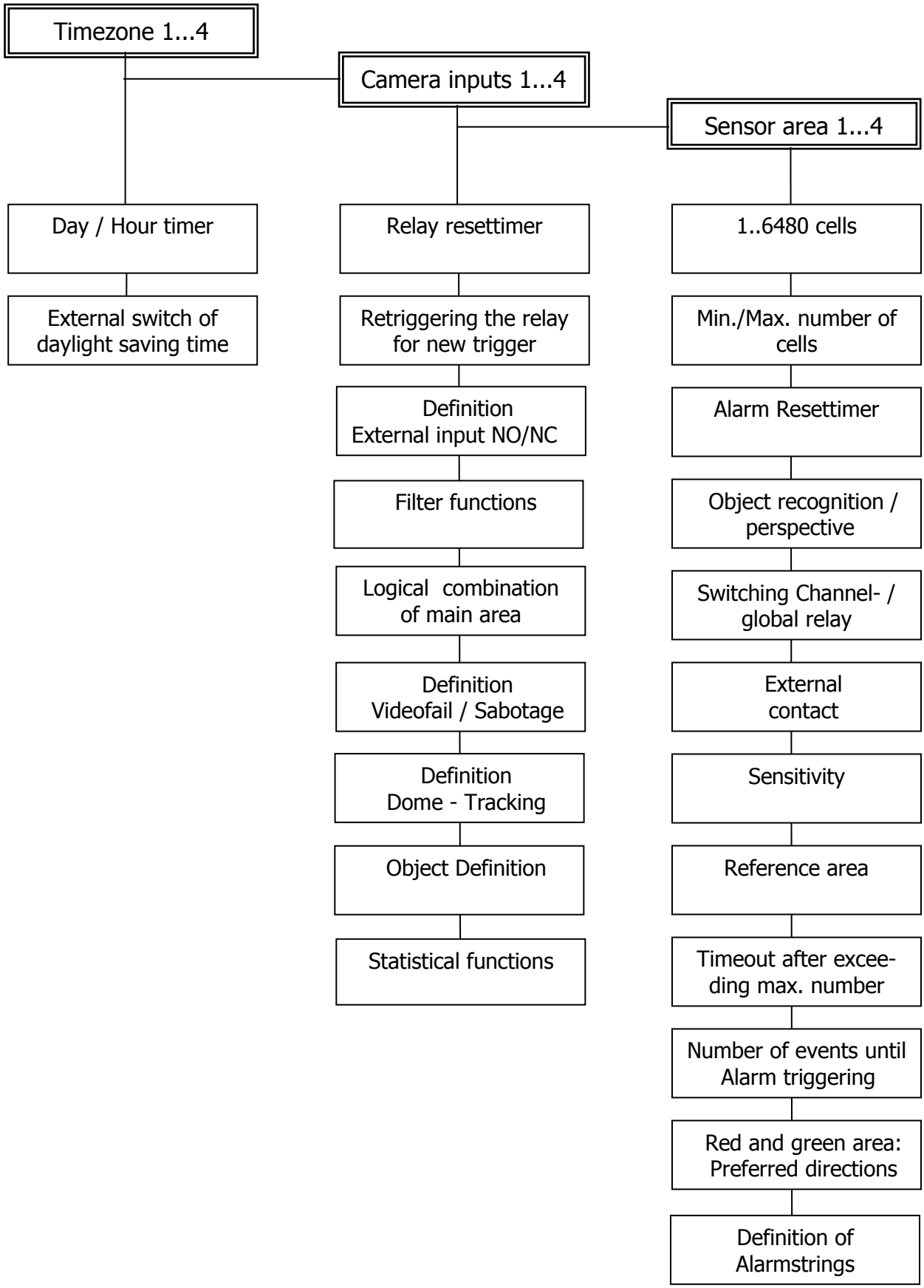
In case of a detected object the sensor can control a dome camera regarding to the centre of gravity (‘Dome tracking’). You can choose a protocol from a list of many well known manufactures.

Having programmed all setup-parameters, these are transferred from the PC to the DMD-4. The sensor now operates with the new parameters independently from the PC.
The setup data can also be stored on hard disk/diskette. Thus it is possible to transfer standardized settings without great effort to several sensors. In case of failure, the service engineer can determine whether the setup has been changed by unauthorized persons and he can directly reestablish the original configuration.
The camera pictures including the defined sensor areas can be stored in graphic format (*.jpg or *.bmp) for documentation purposes.

DMD-4 uses state-of-the-art Flash technology:
Upgrading the operating software (firmware) can be performed without opening the equipment; upgrades can be loaded via PC or laptop via the RS232 interface.

In the following sections the setup functions, the individual sensor parameters and their settings are briefly described. The diagram on the following page shows an overview of the parameters that can be configured in the menu.

## 5.0 Setup structure



The chart on the previous page shows, that the different functions of the DMD-4 are linked to the spheres of timezone, channel and area. These three spheres have the following hierarchical structure:

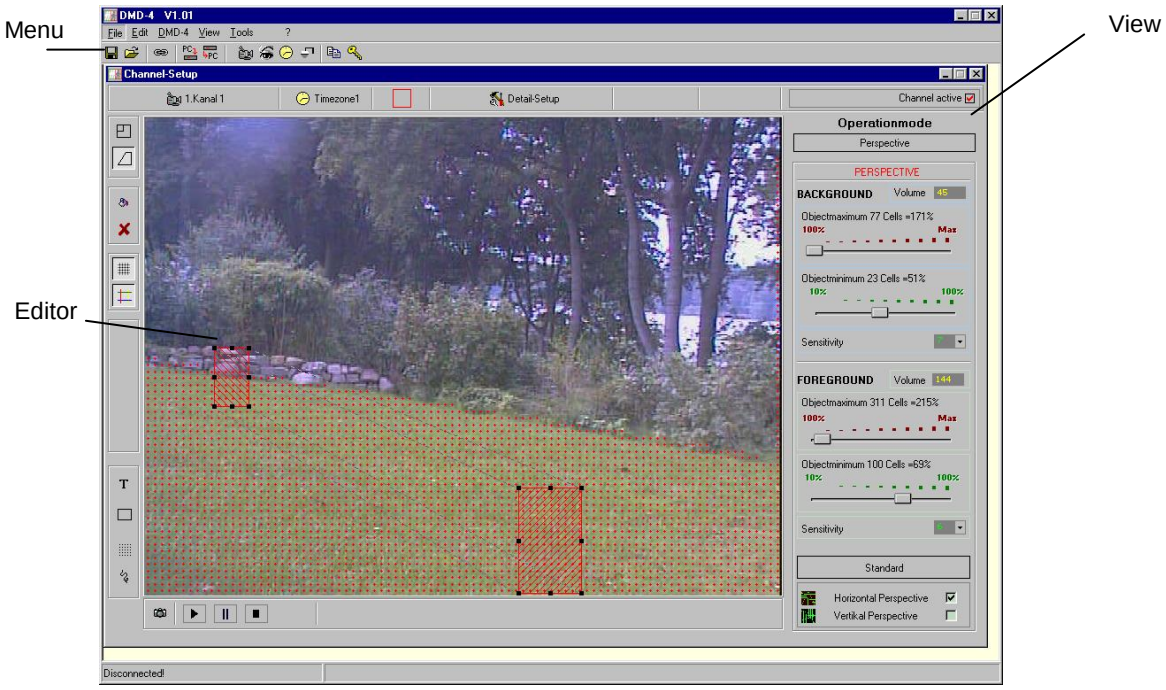
**Timezone → Channel → Area.**

Each of the timezones has four channels, each with four sensor areas. Therefore all parameters assigned to a timezone are valid for all subordinate channels and the corresponding sensor areas, too.

In the next chapter the structure of the PC dialog and the function of all parameters are described.

## 6.0 PC Dialog

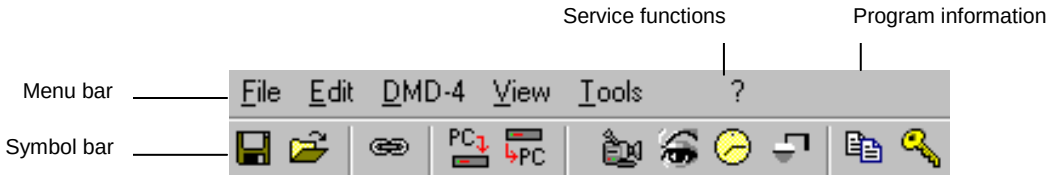
After starting the program, the main window appears on the monitor.
Via the upper menu bar all sub menus for communication and global settings are reachable.
Under them an editor appears with the most important channel settings. The parameters can be directly adjusted in this window.




Standard settings (default values) are defined for all four camera channels.
All “switches” and input fields feature help texts, so that the user can quickly become acquainted with the setup procedures.

The following pages describe the individual setup functions:

## 6.1 Menu




The menu is divided in two areas: The *menu bar* includes functions via pull-down menus, who are reachable via buttons of the symbol bar too, and further configuration tools (service functions) and viewing options.

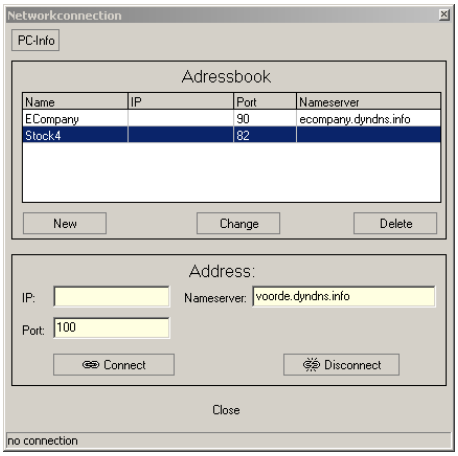
### 6.1.1 Symbol bar:

Provides direct access to all important functions:

**Save / Open File:**

Saves / Loads a setup configuration previously stored on harddisk or diskette. This allows, for example, programming the sensors with standardized settings.

**Connection via TCP / IP:**




Opens a submenu for data transmission via TCP / IP or close a connection:

In the address list you can manage IP-addresses of many sensor units.

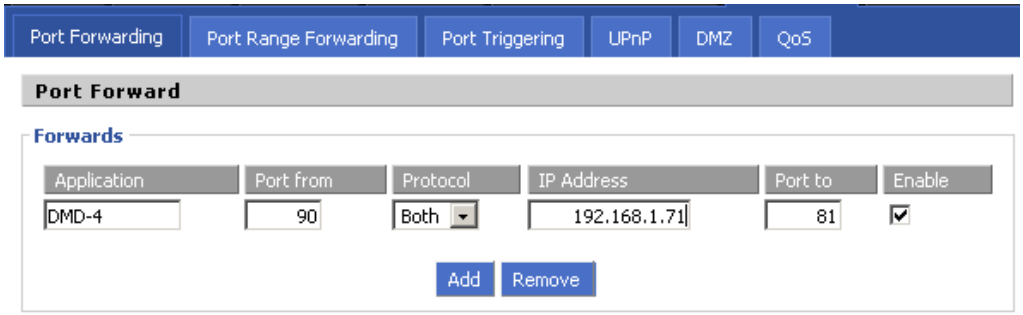
For open a connection select the desired name and click to the ‚*Connect*'- Button.
If the connection has been successfully established, a message appears and the dialog box is automatically closed.
The termination of a established connection can be done via the ‚*Disconnect*'- Button.

The connection to the DMD-4 can establish via Lan or for remote maintenance over the internet.

**LAN**:
In the LAN the connection to the DMD is defined by IP-address a Port-No. (Delivery state: IP: 192.168.1.254; Port 81). The PC or Laptop must have an address in the same number range (e.g. PC: 192.168.1.51).
Mouse-clicking on the PC-Info button displays the actual IP-address. The IP-address can be changed in the windows-menu (Network->LAN->Settings->Internet protocol). Subnet mask is 255.255.255.0.
When it`s not possible to change the IP-Address then its necessary to change the address of the DMD-4 (s. 6.1.2, sensor options).

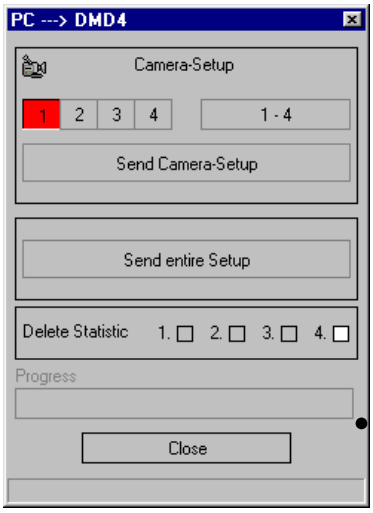
**Remote maintenance**
To configure the DMD-4 via remote maintenance the DMD-4 must be connected to a router who has access to the internet. Normally the router is registered to a Nameserver like DynDNS.org, ZoneEdit.com, NoIP.com e. c.. In our example the identifier is *ecompany.dyndns.info*.

The field Nameserver is filled out with the identifier, Port-No is the number who is registered under Port-Forwarding in the router menu.
Port-Forwarding means that data packages from the internet with a specified Port-No are transferred to a specified IP-address in the LAN.
Example:
The DMD has the IP 192.168.1.71, Port-No. 81. The route menu is so configured, that all incoming data packages with the Port-No. 90 are transferred to the DMD-4 address.




## Data transmission PC → Sensor:

Opens a dialog box for controlling the transfer of setup data from PC to the unit:




- **Send Camera-Setup:** Programs the sensor with the parameters that have been configured in the PC setup. This irrevocably overwrites the setup data in the DMD-4. Use the camera selection buttons (appears in red) to select the channel that has to be transferred.
  If the connection has been successfully established, a progress indicator bar shows the progress of the data transfer. When the transfer has been completed, the dialog box is automatically closed.

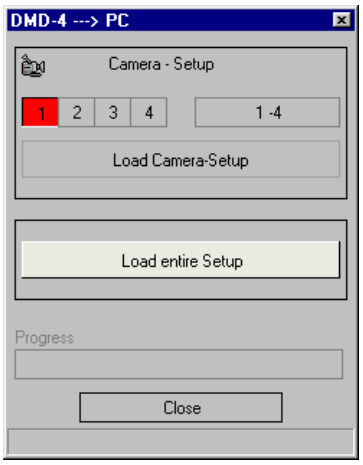
  **Send entire Setup:** Programs the sensor with the parameters of all 4 cameras inclusive the global settings.
  The data transmission is performed as described in "*Send Camera-Setup*".

In case of errors during data transmission the status line displays error messages:
If, for example, the connection cannot be established, the connection settings must be checked.
If an error occurs during data transmission, the process must be repeated.

- ..**Delete Statistic**: The sensor analyses each channel regarding his regular movements over the whole picture area. Over a longer time period the individual, statistical results will be collected and stored in an internal memory. After a fundamental change of settings or after turning of the camera this clear function of the statistic values is recommend.

### Data transmission Sensor → PC:

Opens a window for controlling the data transfer from DMD-4 to the PC.




- **Load Camera-Setup:**

Loads the sensor configuration of the desired camera (red button). This irrevocably overwrites the setup data of the PC. The data transmission is performed as described in "*Send Camera-Setup*".

- **Load entire setup:**

Load the setup configuration of all four channels and the global settings of the DMD-4.
The data transmission is performed as described in "*Send Camera-Setup*".

### Open Channel Setup:

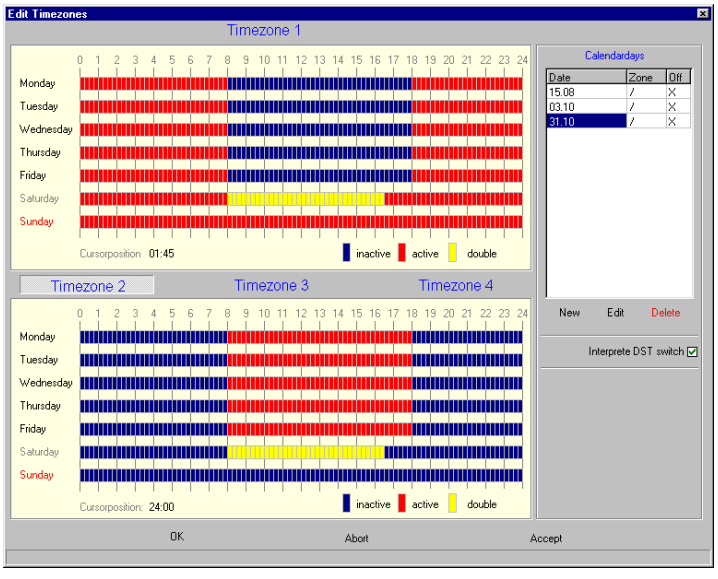
Opens in the viewing window below for setting all basic parameters of the channels (see page19).

### Open Channel-preview:

Opens a quad-view for all 4 channels, who are refreshed sequencial with the live pictures. By mouse-clicking to one of the windows you can call up directly the regarding Channel-Setup.

### Time zone definition:

Each channel of the DMD-4 is equipped with a total of four time zones. Different sensor areas can be placed for each of these zones. Therefore four completely independent day and week programs are editable for each channel.



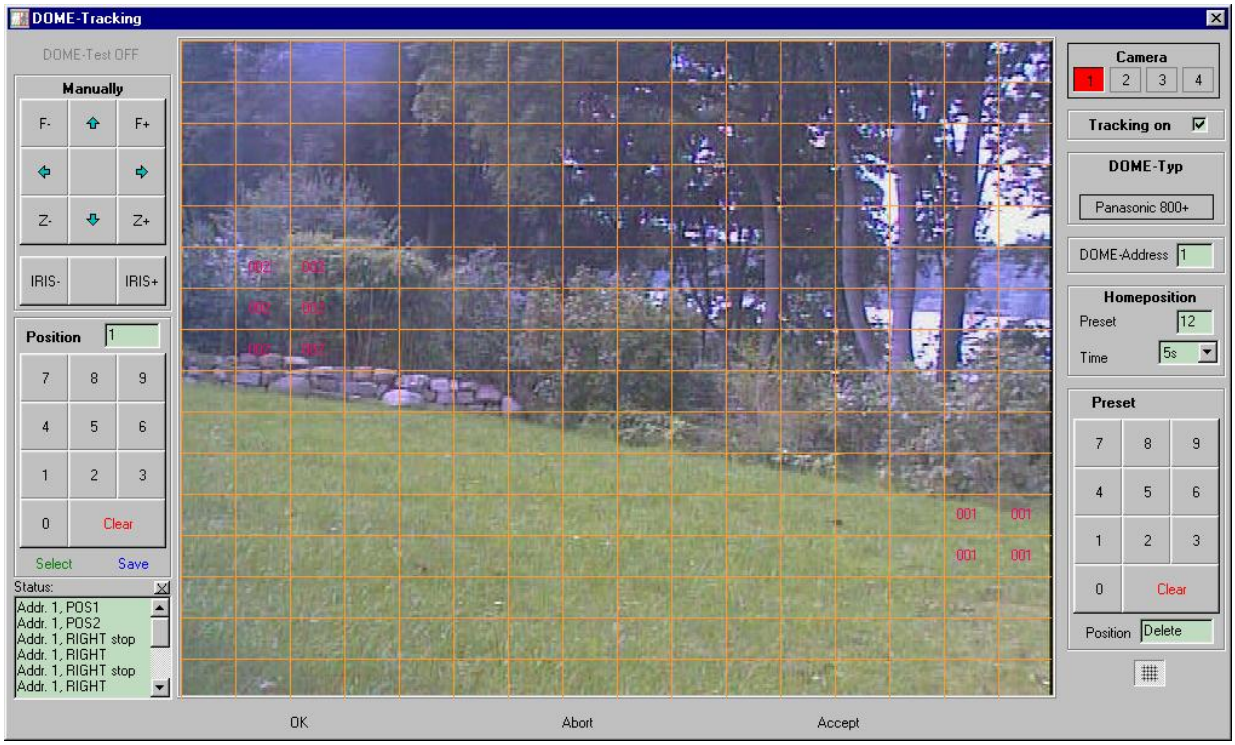

First of all the zone to be defined is selected with the camera- and timezone-buttons:
The timezone 1 is always displayed in the upper half, one of timezone 2-4 in the lower half of the window. With a mouse click or Drag & Draw (drag the mouse by pressed left button) you can define the active time for timezone 1 (shown as red blocks). In the left image there is an example for different shopping times. All the periods of the closed store are registered in timezone 1 as shown on the left side.

The blue blocks indicate an inactive time area. Time arreas, which are overlapped by two or more timezones are colored yellow.
The priority within the four time zones is defined as going down from zone 1 to zone 4. Example: If zone 1 and zone 3 overlap, only zone 1 is active. If you only need to work with one time zone than there is no need to program all zones:
Marking the hole area (*Monday...Sunday* , *00:00...24:00 o'clock*) for timezone 1 activates the system for the whole week, 24 hours a day.
Note: The sensor is disabled if not one of the 4 timezones is active.
For some calendar days you can define the special zone-function on these days. The definition of calendar days is independent of any years!

The sensor is equipped with an integrated switching input of daylight saving time (DST). If the switch is activated (*interprete DST switch*) the sensor automatically switches – in case the contact is closed – between the timezones as follows:
When the contact is closed, the unit regards - in according to the time definition – only the settings of timezone 2 or 4. On the other hand (contact is open) only the parameters of zone 1 or 3 are possible.
Example: A day- and night program has to be defined for Monday to Friday respectively Saturday and Sunday each. For that purpose the whole time area from Monday to Friday is activated in zone 1 + 2, the same area of Saturday and Sunday in zone 3 +4. This result that Mo.-Fr. the unit is defined by timezone 1 during the day, in the night by the settings of zone 2. On the weekend (Saturday, Sunday) the sensor switches between timezone 3 (during the day) and timezone 4 (night)..
By using the DST switch the priority is also valid: If the active areas of time zone 2 and 4 are overlapping to each other, in the overlapping area only the settings of time zone 2 are valid.

## Dome-Tracking:

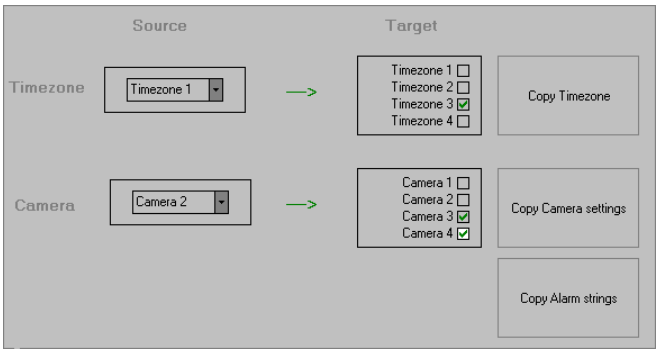
Using the mode *Dome tracking* the sensor controls the presets of a P&T head regarding to the coordinates of an object, which has been detected. According to different camera-types and –protocols the sensor has to be programmed with a special ‚Dome-Firmware' (see *Sensor options*). An information about the activated protocol appears by using the ‚*Dome-Typ*'-button (The default protocol is ‚Panasonic').
The individual setting of presets, dome address and home position can be adjusted for each channel in the following dialog box:




First of all the Dome tracking mode has to be activated (‚*Tracking On*') and the dome address has to be entered. Optionally you can define a home position: After expiration of ‚*time*' since the last preset command the sensor will call up this preset number automatically. Note: Activating the Dome tracking mode automatically activate the RS485 interface (s.p. 28).
All preset numbers can be defined for each cell within a 16x16 grid:
Using the numeric pad buttons of ‚*preset*' the actual preset number in the position field is entered. Then the mouse cursor is positioned on a grid cell and by clicking the left mouse button the cell is defined by this number. Deleting cells is performed as follows: Define the actual position as ‚Delete' (‚*Delete*' button) and click on the desired cell. When the mouse cursor is positioned on a cell, that has been already defined, the preset number of ‚position'- field will be overwritten by the cell-preset by clicking the right button.
To control defined presets in according to the picture areas of the reference camera you can activate *‚Dome Test ON'* using the connected sensor/dome:
Clicking on a defined cell or using the numeric pad on the left and the ‚*Select*' button the sensor will send the command for the desired preset number. If required you can manually adjust the settings of the preset (P/T, zoom, focus, iris).
Please use the button *‚Save*' to store the new preset settings in the dome.
The window of ‚Status' shows the last commands.

**IMPORTANT:** The following conditions have to be performed for dome tracking:
▸The centre of gravity of the object is within an area with ‚object mode/perspective'; ▸The channel is activated; ▸The object size is between minimum and maximum number of cells.

## Copy Setup Data:

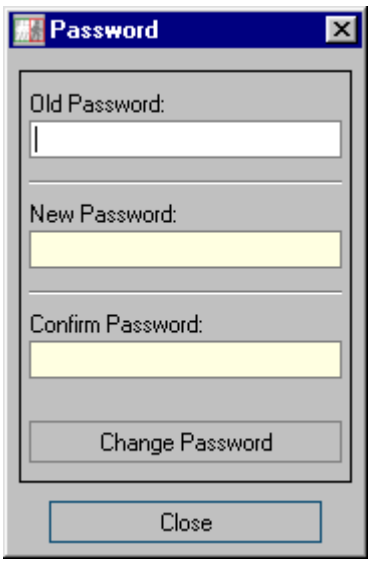



This option allows the copying of sensor settings within the channels or timezones:
In the left example all data of timezone 1 will be copied to timezone 3+4 over all 4 channels, regardless of the '*Camera*'- configuration.

However, by copying Camera settings or Alarm strings the source/target-configuration of timezone is important:
According to the upper timezone definition all camera data /alarm strings of camera 2, timezone 1 will be copied to timezone 3 of camera 3 and 4.
Therefore the user does not have to program the whole setup anew if the parameters of the sensor areas only differ marginally.

## Change Password:

The setup data is protected from unauthorized access by a password. A data transmission can only be executed successfully if the password of sensor and PC program is the same. It is recommended to alter the password immediately after the first start of the setup program.
NOTE:
The password can only be changed when the sensor is connected to the PC interface and has a maximum length of 10 characters and is case-sensitive!
The password can be changed in the following dialog box:

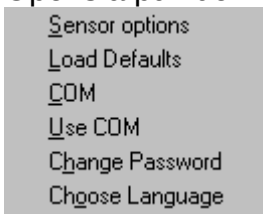



- **Old Password:** Enter the current password of the DMD. The pre-configured password is "**video**".
- **New Password:** Enter the new password.
- **Confirm Password:** Repeat and confirm the new password.

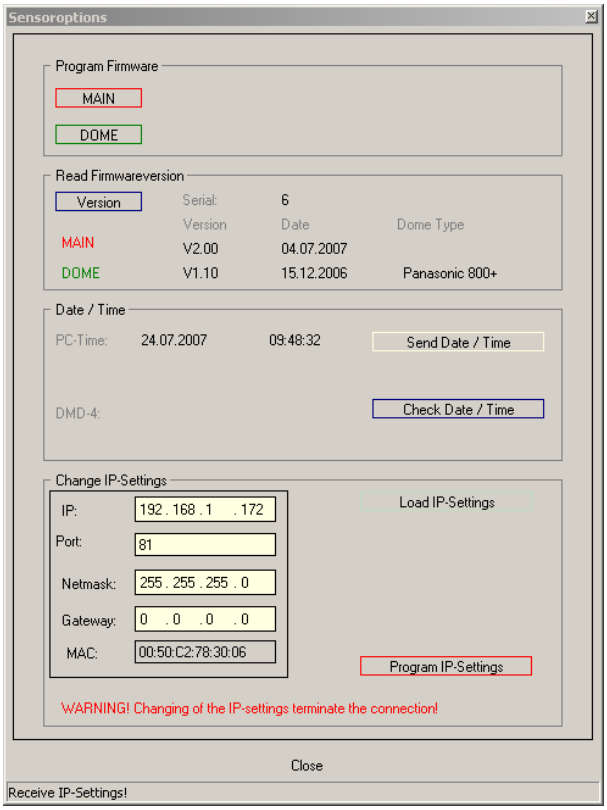
The new password is accepted by clicking "*Change password*".

**Attention:**
When the password has been lost, please contact your dealer.

**Service tools:**
Opens a pull-down menu for controlling the following submenus:




- **Sensor options:**




**Program Firmware:**
The sensor is Flash-programmable. This means that the firmware can be transferred to the processors by a PC. Changing EPROMs and thus opening the device is not required.
When the firmware is changed, for example during a functional upgrade or with special software, the firmware is loaded to the DMD-4 via this dialog box.
The sensor is equipped with 2 flash memories: *Main* and *Dome*.

By clicking the corresponding button, the Windows “Open File” dialog box is opened and you can select the file (*.bin) to be programmed. Subsequently, the transfer to the sensor is done and a percent display indicates the progress of the process.

After successful transfer, the message “ Firmware programmed” is displayed on the right hand of the button.
In case of errors during data transmission the status line at the bottom displays corresponding error messages.

**Read Firmwareversion:**
The actual firmware versions and the date of each last programming action are displayed. By pressing the ‘version’ button the current data of the DMD-4 are displayed.
An overview of the current releases is shown on Appendix (page 34).

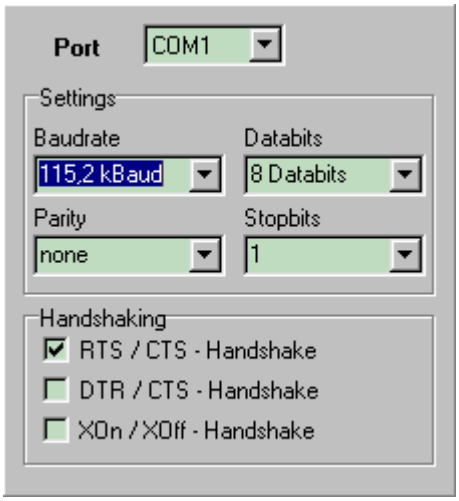
**Date / Time:**
By clicking the button ‘Send Date /Time’ date and time are transferred separately in order to synchronize the internal clock of the DMD-4 with the system clock of the PC. You can double check the actual time setting by clicking on ‚Check *Date/Time*‘.

**Change IP- settings:**
Allows reading out and changing the actual IP-configuration of the sensor.
Notes: Changing of the IP-address will always result a disconnection of the established network connection. If necessary the PC / laptop have to be switched to the new IP-address. It is recommended documenting the actual IP-configuration.

- **Load Default:**

Restores the default values (restart) of the PC user interface.
ATTENTION: A reset overwrites all current setup settings of the user interface with default values!

- **COM:**




Allows setting up the configuration-RS232 interface of the PC (COM1…COM50), to which the sensor is connected:

The DMD-4 interface is factory-configured as follows:
- .. 8 data bits
- .. no parity
- .. RTS/CTS
- .. Baud rate 115.2 kB.

- **Use COM:**

Defines the kind of configuration interface Ethernet (default) or RS232-comport (settings see above). By clicking to point ‚*Use COM*' you switch between of using Comport (a ‚●' appears in front of ‚*Use COM*') and the Ethernet ( the ‚●' disappears ).

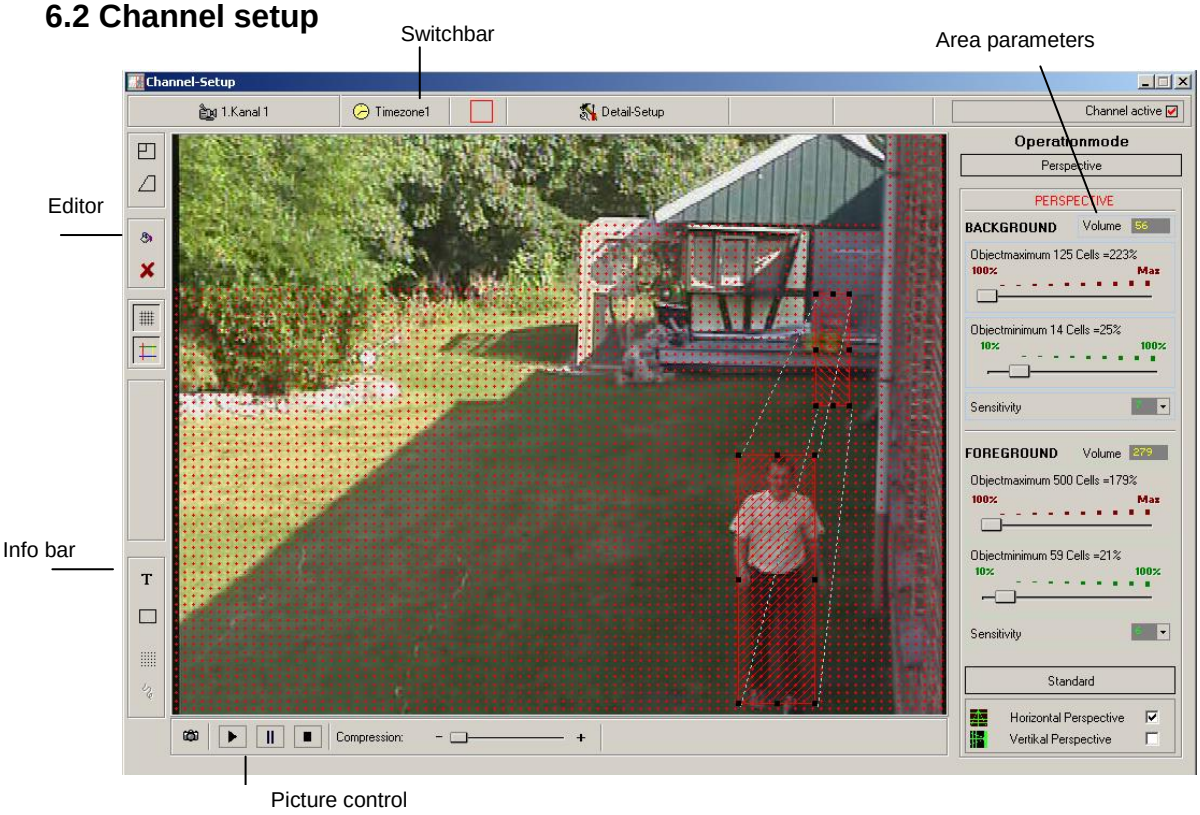
- **Change password:**

Opens a submenu for changing the actual password setting. You will find further descriptions on page 16.

- **Change language:**

Opens a window for changing the actual language setting of the PC-program.
The setting will be valid after a restart of the PC too.

## 6.2 Channel setup

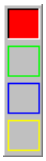



### 6.2.1 Switchbar:

**Channel switch:**
Switches between setup setting of camera 1...4.

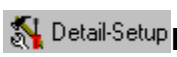
**Timezone:**
The timezone to be configured is selected with this button.

**Area switch:** To be able to distinguish the sensor areas from each other via pull-down menu:



= Mainalarm area
= Prealarm-area 1
= Prealarm-area 2
= Prealarm-area 3

In the example shown above, the setup parameters refer to sensor area 1 of camera channel 1.



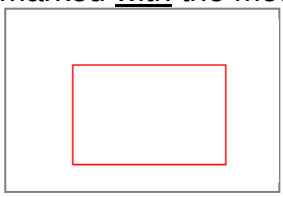

**Detail-Setup:**
By activating an overview of all channel parameters will be displayed (see description on page 25).

### 6.2.2 Editor:

The editor area with the camera picture of the corresponding channel is divided into 6480 parts, called cells. The sensor area is defined by all highlighted blocks of the corresponding color. It is not necessary that all blocks are adjacent to each other. An overlapping of two or more areas is not allowed.
The editor tool bar provides several functions for the editor display and for positioning the individual cells:

**Define / Delete area:**

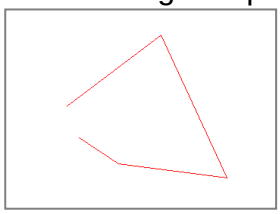
If a larger area of the sensor area is to be activated or deactivated, this area can be marked with the mouse:



Position the cursor in the editor, press the left mouse button and draw a frame around the desired cells by dragging the mouse. Depending on the sensor area selected, the rectangle is shown colored. The corresponding function is executed on the marked area, after releasing the left mouse button.
Deleting cells is performed according to the same principle: The mouse cursor is positioned on an cell and by clicking the right mouse button the rectangle appears black and after releasing the right button all cells in the defined area are deactivated.

**Define / Delete polygon:**

The drawing of a polygon allows a quick area definition:



By pressing the left mouse button you define the edges of the polygon. If you have keep pressed the left mouse button for 2 seconds: All cells inside of the polygon turn in the area colour and are activated.
Deleting cells is performed according via the right button: the edges of the deleting polygon are defined by pressing the right mouse button. After definition of all edges you have to press the right button for approx. 2 seconds, and all cells inside of the polygon will be cleared.

**Set all cells:**

Activates all cells from the current sensor area. If some cells also defined by another area, only the remained cells will be activated.

**Delete current area:**

Deletes all cells from the current sensor area.

**Show / Hide area display:**

Switches between the camera image with or without displayed area in order to check the right overlaying of picture and cells.

**Show all areas:** For easier positioning it is possible to display all areas in the editor. The area that has been selected by the area switch is edited.

### 6.2.3 Picture control:

For an exact overlay of the defined area the picture of the corresponding channel has to be displayed. You can receive a single picture from the connected sensor.
Furthermore you can get a continuous live stream of up to 6-7 pictures / second, in order to control the analysis of the sensor. Different display functions of the internal sensor information are available and are descript on chapter 6.2.4 .

**Load current single picture:**
The old picture display will be overwritten by a new picture.

**Start picture stream:**
The displaying of current live pictures will be started.
Notes: For changing of parameter settings it is recommend to stop the picture stream first.

**Pause picture stream**
The displaying of picture stream will be paused.

**Stop picture stream**
The continuous picture stream will be stopped, in the editor field remains the last received picture.

**Compression**
Change the compression rate of the transmitted picture. To enhance the picture rate while connected to the DMD over DSL, it´s recommended enhancing the picture compression.

### 6.2.4 Info bar:

By viewing the picture stream there are some tools to inform the installer about the internal effect of the DMD:

**Show / Hide picture info:**
Displays information about size, date in the left, upper side of the picture.

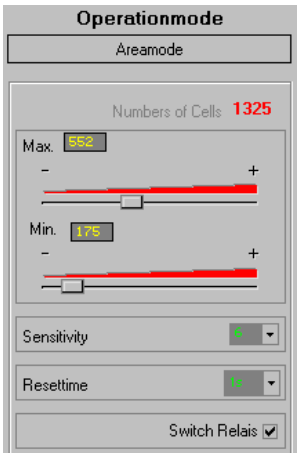
**Show recognized objects**
The sensor will mark objects, who correspond to the defined object size, as a green frame, additional with a motion vector. In case of an alarm the state will be displayed above of the frame.

**Show all activated cells**:
Alterations in the camera picture are visible foe each individual cells. The sensor will mark the cells as orange points.

### 6.2.5 Area parameters:

Up to 3 different operation modes can be defined for each area. The displays of parameters switch in according to the desired function. The meaning of each mode and the corresponding functions are described on the following pages:

- **Areamode**




Every sensor area has parameters that can be edited independently from the other areas in this dialog box. A selection of fundamental parameters is shown on the right hand of the edit field:

**Number of cells:** The display of activated cells (here 1325) is only an information and will not be stored in the sensor.

**Max.:** A change of the picture is only evaluated as an alarm, if not more than the set cells detect a movement (here: 552).
The desired number of cells is set by means of the slide control (the value appears absolute and as percentage).
Note: The sensor area is deactivated at the “Max” setting (=0).
Tip: You can change the slider-value in single steps by using the arrow keys of your keyboard.
If more than the set cells detect a movement, the timer “Max break” (see page 26) is activated. This function prevents triggering for brief changes of the light conditions etc.

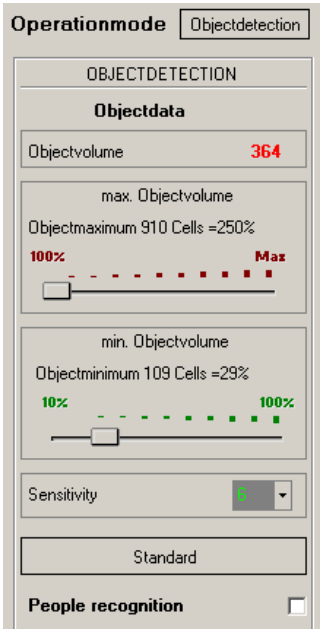
**Min.:** The alarm is only triggered if at least the number of set cells detects a change in the sensor area. Thus, too small and therefore irrelevant objects do not cause an alarm.
Note: Min=0 is the same as Min=1, which means that at least in one cell a movement has to be detected before the area is triggered.

**Sensitivity:** Sets the sensitivity for all marked cells of the sensor area. The higher the value set (1-10), the higher is the sensitivity of the cells.
“*Sensitivity*” defines the trigger’s sensitivity of the time interval.

**Reset time:** Is started when the sensor area initiates an alarm.
After expiration the alarm of the sensor area is reset. This includes: The display of the area, the internal linking (see “*Logic*” on page 30) and the transmission of the serial alarm strings (‘*Alarm OFF strings*’, see page 28) .
NOTE: The alarm relay – if activated – is only reset after expiration of the relay energizing time set under “*Camera options*” .

- **Object detection**

In the object mode all detected, contiguous cells are combined as one or more objects according to their position to each other. The object size and not the total number of activated cells will be compared to the defined number of maximum/minimum cells. Up to 32 independent objects can be detected within the defined area simultaneously. The following illustration shows the object detection mode:




**Objectvolume**: Number of the cells that are enclosed by the rectangle in the edit field (in the example on the left side 364). The number is only information to estimate the object size. This parameter has no further influence and will not be stored in the sensor unit.
The definition of the object size can only be set by *Objectmaximum/Objectminimum*, described next.

**Objectmaximum / Objectminimum:** An object within the defined area is only evaluated as an alarm, if the number of detected cells is between the objectminimum and objectmaximum (in the example between 109 and 910 cells).
Exceeding the objectmaximum will start the timer ‚Max. Break', if selected.

**Sensitivity:** The entry of the parameter is performed as described in *Area Mode*.

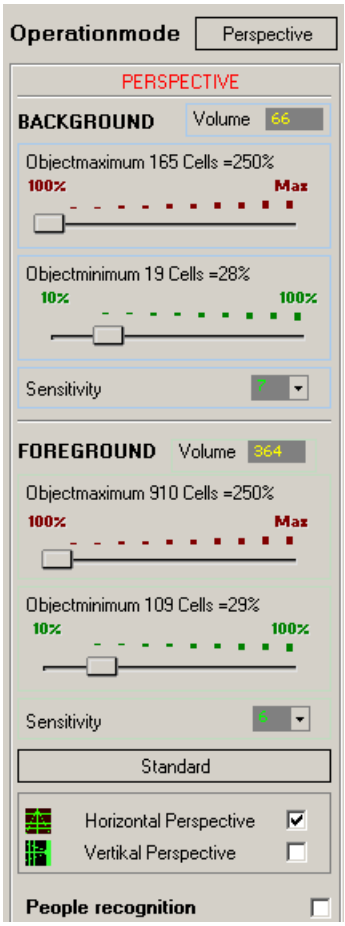
**Standard:** According to the object volume of the rectangle the values of max. – and min. object volume will be set to 250 per cent and 29 per cent respectively. This value is a basic parameter based on operating experiences. However the installer has to find out the optimal values according to the real scenery.

**People recognition:** The meaning and possible parameters are described in Detail-Setup (*Area options* and *Expert*).

- **Perspective**

The sensor is detecting in addition to the object mode according to perspective parameters. Two rectangles appear on the edit area for defining the position of the foreground and the background.
Important: The number for the object size in the foreground / background (example of image: foreground 364, background 66) is only information to estimate the desired object size. The definition of the object size is effected by the parameters *Maximum/Minimum* on the right hand of the edit:

**Background**: An object on the background position (Definition: center of the rectangle) triggers only an alarm if the number of activated cells is in the range of object minimum and object maximum (In the example between 19 and 165). The same range is valid for objects that are farther away. For more information see *object foreground*. The sensitivity is valid for all cells that are on the background position or farther.




**Foreground**: An object at the fore position (Definition: The centre of the fore rectangle) triggers only an alarm if the number of activated cells is in the range of object minimum and object maximum (In the example between 109 and 910). The same range is valid for objects that are positioned nearer. The sensitivity is valid for all cells that are on the foreground position or nearer.

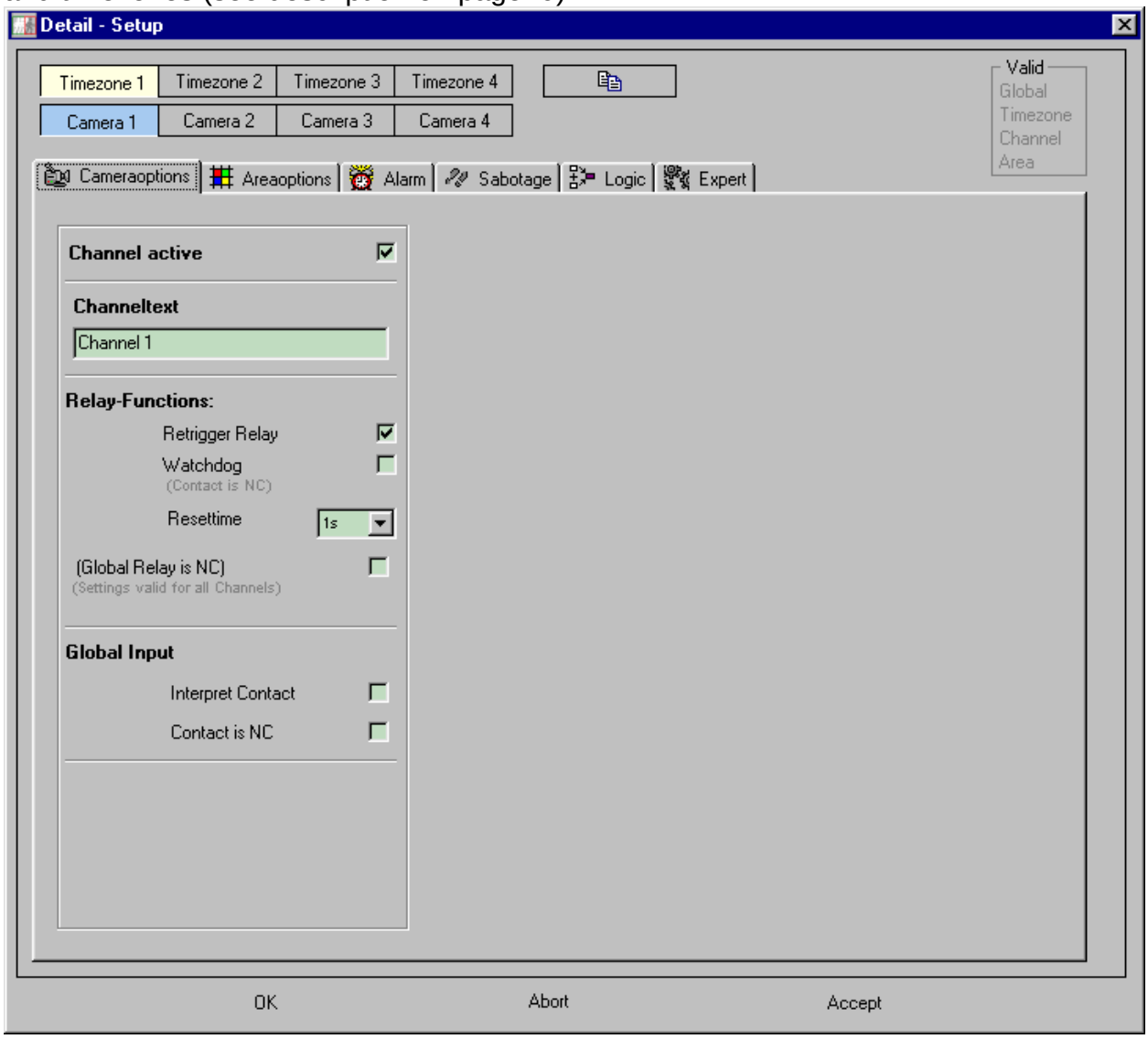
**Important note**: For all object positions between fore- and background the sensor calculates automatically the intermediate values of maximum, minimum and sensitivity.

**Standard:** According to the object volume of the rectangle the values of max. – and min. object volume will be set to 250 per cent and 29 per cent respectively.

**Perspective:** There are two kinds of perspective-definitions:
*Horizontal*: An object, that is moving at the same image column, appears smaller in the upper rows (background) than in the lower rows (foreground). This is typical for camera configurations outdoors.
*Vertical:* An object, moving at the same image row, appears smaller (bigger) on the left side than on the right side, for instance a camera perspective along a wall.

**People recognition:** The meaning and possible parameters are described in Detail-Setup (*Area options* and *Expert*).

**6.3 Detail Setup**:
For each of the four channels special parameters can be set. The menu is devided in different areas. The validity of the current parameter is green displayed in the upper right edge ‚*valid*'.
Via the switch buttons of timezone and cameras all important seto parameters can be directly adjusted. Via the copy button you can copy the parameters between channels and timezones (see description on page16).




The following pages describe the function of the submenus:

### 6.3.1 Cameraoptions:

- **Channel active:** Allows quick activation/deactivation of the channel, for example when maintenance works in the viewing range of the camera are not supposed to trigger the sensor or to be detected as sabotage.

- **Channel text:** The text can be edited directly in order to identify the meaning of the camera. This identifier appears in the Channel setup.

- **Relay functions:**

Defines the settings of the channel- and global relay. The definitions *Retrigger* and *Re-settime* are valid for both relays.

**Retrigger relay:** If another alarm occurs during the time the relay is energized, the time is automatically prolonged by the configured time.

**Watchdog:** (De-) activate the watchdog function (relay is normal closed) of the channel relay.

**Resettime:** Defines the time the relay is in energized state. The maximum time is 120 seconds = 2 minutes
NOTE: The selected time is equal to the auto reset time for the LED display.

**Global relay is NC:** If activated, the watchdog function of the global relay is on.
.

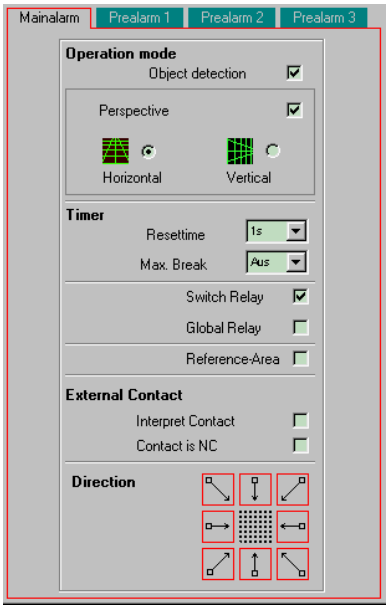
- ..**Global Input:** The sensor is equipped with an external global input, which can be considered by each channel separately :

**Interpret contact:** If activated the contact state has to be according to the global contact definition (see next parameter).

**Contact is Normally Closed:** Subordinate channel can be linked to this input.
When the channel parameter '*Interpret contact'* is activated, the channel only triggers if

**a.)** the global input has been closed (checkbox '*Contact is NC*' is active)
**b.)** the global input is open (checkbox '*Contact is NC*' is not active).

### 6.3.2 Areaoptions:




All important parameters of the main area and the 3 prealarm areas are listed in this submenu. You can switch the setting between the areas by clicking on the upper buttons.

- ..**Operationmode:**

Defines the kind of operation mode (see description ‚*Area parameters*' on page 22).

- ..**Timer:**

Defines the following timer:
**Resettime:**
Timer is started when the sensor area initiates an alarm. After expiration the alarm of the sensor area is reset. This includes: The internal linking (see "*Logic*" on page 30) and the transmitting of the serial alarm strings ('Alarm OFF strings', see page 28).

NOTE: The channel relay will only be reset after expiration of the relay energizing time set under "C*ameraoptions*".

**Max. Break:** Time within the sensor area stays inactive after exceeding the maximum permissible number of triggered cells (Min./Max.).
Prevents repeatedly triggering after turning on room lights etc.

- **Switch relay:** The relay of the corresponding camera channel is energized for an alarm of the sensor area.
Note: If the area is only to trigger a pre-alarm, this function usually must be deactivated.

- ..**Global Relay:** The global relay is energized for an alarm of the sensor area. The function of this relay is a logical OR-function of all areas, who switch according to this function the global relay.

- ..**Reference area:** If an area is defined as reference area, it is evaluated with priority: In any case, the reference area is analyzed before the other area of the channel. Where a reference area is defined to suppress influences that make an effect to the whole picture e.g. weather influence like clouds.

- **External contact:**

Each channel is equipped with an external input, which can be taken into account for alarm processing.

**Interpret contact:**
When the option is activated, the sensor area only triggers if the external input has been connected in the manner (normally open or normally closed) that has been defined as '*Contact is NC*' .The external input allows several applications:
Controlling the sensor area by an automatic timer, additional combination with an IR alarm, manual control (gate keeper) etc.

- **Contact is NC:**

When this area parameter is activated, the sensor area only triggers if
**b.)** the external input has been closed (checkbox '*Contact is NC*' is active)
**c.)** the external input is open (checkbox '*Contact is NC*' is not active).

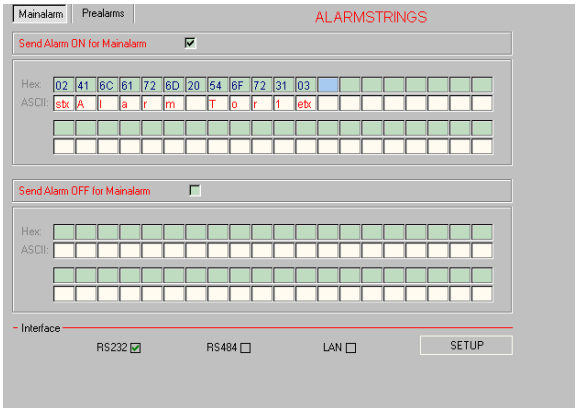
- ..**Direction:** Configuring eight possible direction preferences, objects triggers only an alarm those movement is in the selected direction. Movement in the opposite direction will not trigger any alarms. If no direction is selected (all arrow buttons appears with red frame), no direction filter is active and all movements could cause an alarm.

- **People recognition:**

Each detected object of the area can be analyzed concerning to a contour of a person. This mode should only be activated for the limited purpose of people recognition. Other objects would not cause any alarms. The definition of the people recognition can be done for each channel and is described in menu *Expert* (see page 32),

### 6.3.3 Alarm:

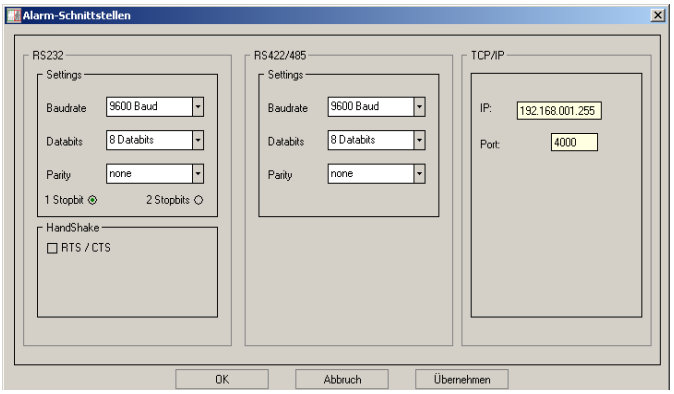
Allows the configuration and entry of a character string (alarm string) that is transmitted via the RS232/RS422- or Ethernet interface of the DMD-4 to peripheral devices like a switch or recording system




Alarm strings can be defined for the main area and for the three prealarm areas of a camera channel. By clicking to the buttons *Mainalarm* and *Prealarms* you can switch between the different editor menus.
The sensor can transmit one data string after alarm activation anf after Resettime has expired. Thus the peripheral devices connected can be controlled differently for alarm activation and expiration of the Alarm Resettime.
Example: For an alarm a matrix-output switch to a full picture of the corresponding camera. After the expiration of the Auto Reset time, the sensor will send a command for quad view.
The maximum string length is 40 characters. The characters are input in hexadecimal notation, i. e. only characters from 0…9 and A…F are allowed.
This type of character-coding allows transmission of any text and control commands.
Important: The string is only transmitted when the box for ON respectively OFF is checked. In the Prealarm menu the checkboxes define these prealarms, who have to send out the defined strings.
The following example shows a character string that has been defined for sending an alarm text:

| **Code (HEX)** | 02 | 41 | 6C | 61 | 72 | 6D | 20 | 54 | 6F | 72 | 20 | 31 | 03 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Character** | STX | 'A' | 'l' | 'a' | 'r' | 'm' | ' ' | 'T' | 'o' | 'r' | ' ' | '1' | ETX |

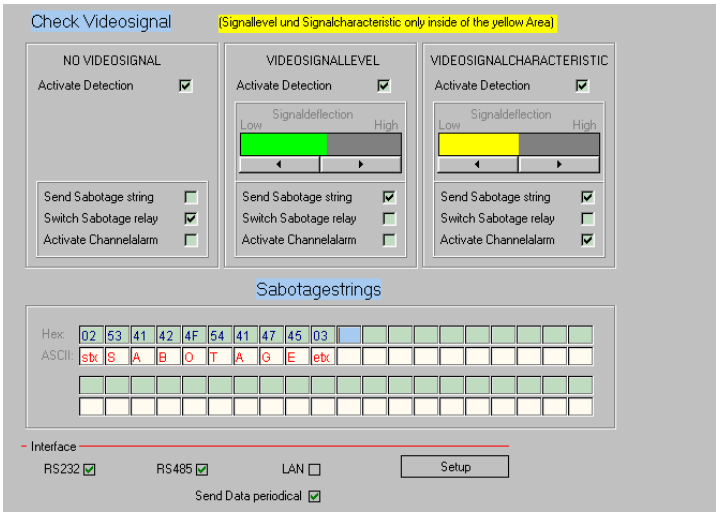
In the submenu *Alarm interface* at least one of the three possible interfaces has to be activated. The menu to define the serial settings appears after clicking on ‚*Setup*' :




IMPORTANT:
If *Dome-Tracking* (view S.15) is active the settings of RS422/RS485 should be in accordance with the data format of the according dome protocol.
In standby mode the RS232 settings of the DMD-4 are adjusted to the data communication between PC and Sensor (see ‚*Use COM*' on page 18).
In the case of sending alarm strings to peripheral devices the sensor automatically switches to the interface settings which have been defined in this menu. After transmitting the alarm string the DMD-4 automatically restores the original interface parameters.
Using the LAN interface the IP address and the port number of the target unit has to be defined. In case of an alarm the sensor will establish an IP connection, and will send the alarm strings. After sending the connection will be closed.

### 6.3.4 Sabotage:

Up to 3 different kinds of sabotage detections can be defined for each of the four channels:




*Video fail*

When a video signal fails – channel is activated (see *Camera Tool Bar*), no video signal has been applied to the input – the LED of the corresponding channel flashes on the front side of the device.

*Videosignallevel*

When this function is activated an arithmetic reference value (for all picture intensities within the defined green area *prealarm3*) over 5 minutes will be calculated in order to take account of slow luminance alteration, like twilight, common changing of weather conditions.
At the same time an arithmetic mean is registered over a short time of 10 seconds. Intensity changes by moving objects effects no alarm. A durable change like covering of the camera objective or a lasting local variation in the camera picture causes a sabotage alarm. In this case after 5-10 seconds an alarm is occurred.
The alarm threshold can be adjusted in 9 steps. In case of outdoor areas (short-term intensity changes by sun or clouds) it is recommended to set the threshold to higher signal deviation.

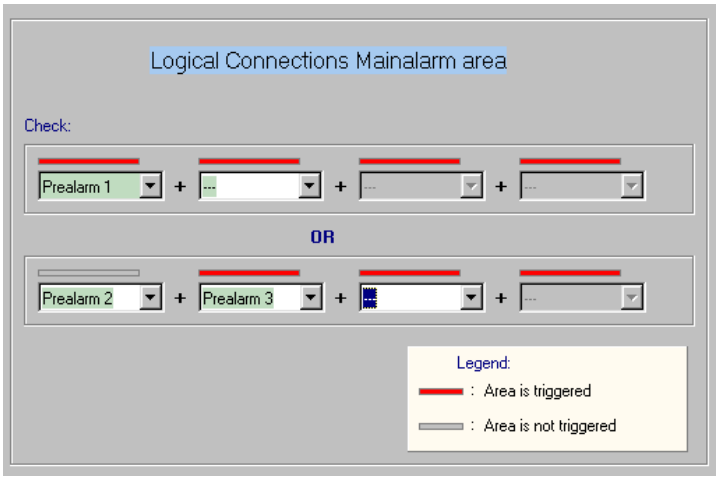
*Signalcharacteristic*

By activating of this function a reference value will be initiated, however as an average difference of the arithmetic mean. The calculation is done for the distribution of all intensities within the camera picture. This feature is especially recommended for high-contrast images, because sabotage by paint-spraying to the camera objective or distorting of the camera-view effects a bad-focused and low-contrast image in the most cases. The reference value is adapted dynamically. The notes for alarm activating and the alarm threshold are performed as described in '*Videosignallevel*'.

A sabotage alarm can be indicated by energizing the sabotage relay and / or by sending a serial sabotage string (definition for each channel; character entry and interface definition as described in '*Alarm*' on page 28).
The relay is energized as long as the sabotage is detected.
The transmission of the serial string starts with detecting a sabotage and – setting 'repeat' is activated – each second anew..

### 6.3.5 Logic:

Each mainalarm area can be logically linked with the channel-own prealarm areas and the mainalarm areas of the other channels. This results in a higher switch security and ensures that temporal sequences are detected.



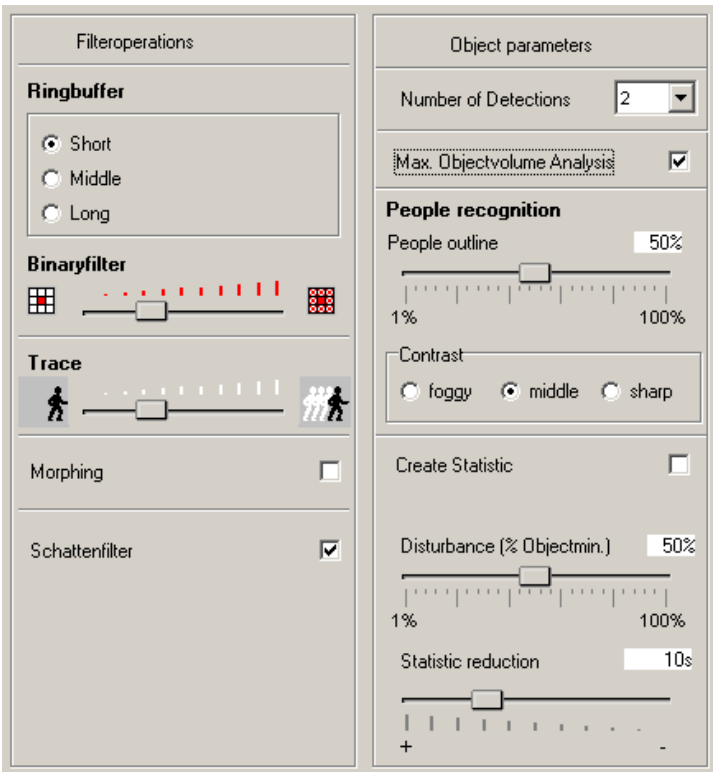

First of all the mainalarm area to be defined is selected with the timezone- and channel- buttons.
Afterwards the combination of the additional areas can be done:
All edit fields, who stands in parallel are together with the defined area AND connected and constitute a term.
Under it one more term can be constituted.
If the conditions of one or both terms are true, the defined area is triggered.

The bar above the entry fields defines the condition ‚area is triggered'(bar is red), or ‚area is not triggered'(bar appears in grey).
In the example above the *mainarea* is only triggered,

- if the green area *prealarm1* is triggered too , **or**
- if the yellow area *prealarm3* is triggered too and the blue area *prealarm2* is not triggered.

### 6.3.6 Expert:

The settings of the expert menu are pre-configured for the most typical applications. In order to adapt the sensor in an optimal way to the real szenary the meaning of the following parameters are descripted:




- **Ringbuffer:**
The DMD-4 scans the entire video picture 8 times per second. Thus, very fast picture changes can be correctly detected.
If tiny objects move very slowly, sensors with a measurement of a fixed, short time interval may not always trigger correctly between two video pictures which are to be compared.
The change in brightness as compared to the time interval is not large enough to exceed the trigger sensitivity (see also "*sensitivity*", page 23).
The DMD-4 solves this problem by an extension of the time interval by means of an internal circular buffer.
Now slow movements in the picture can be correctly detected.

The setting of *middle / long* in connection with changing illuminations can cause unmeant activations particularly in outdoor applications. Therefore this parameter has to be set very carefully.

- **Binaryfilter:** Defines the suppression of noise- and fail-influences against to the detecting objects. The function can be set in four steps.
The size of proximate, detected cells grows by increasing this parameter.
In case of great detecting objects at fore- and background (!) the increment of the binaryfilter value is highly recommend!

- **Trace:** The sensor is analysing all current, detected objects regarding to their further course. The length of the resulted motion vector is a measure for the distance covered. (Trace). The value of the trace parameter defines, whether a recognized object causes immediately an alarm (left position, *trace* is disabled), or after achievement of a minimum trace distance (short, middle, long).
Objects, which are moving predominantly in one direction, can be unambiguously identified. On the other hand, objects that do not move in one direction such as a tree in the wind cause only a local movement without a significant trace.

Note:
Increasing of the value *trace* extends the analysing time of the objects and the time until alarm triggering!

- **Morphing:** If activated, tiny, divided objects will be combined to one object. This mode is helpful in situation of bad contrast to avoid the fragmentation of an object in several parts, which would be too small for the minimum object size.

- **Shadow filter:** Blurred objects and shadows will be ignored by the sensor. Influences of clouds or non-sharp-cut spiders on the lens will be minimized.

- **Number of detections:** Changes of the sensor area that – according to the configured parameters – must cause an alarm has to be detected n times immediately following each other (n = parameter value) before the alarm becomes active. Thus, nonrecurring events such as light reflections can be excluded.
Note:
If an object enters the alarm area an additional delay (n x 1/8 second) occurs before the alarm is triggered.

- **Max. Object Analysis:** If activated, the parameter ‚maximum object size' (area parameters) would be utilized. In many cases exceeding of the defined maximum cells is a global changing over the whole picture area, which shouldn't cause any alarm for a short time (see ‚Max. Break' on page 26).
The disabling of this parameter means that all objects over the minimum number will activate the area irrespective of the defined maximum.

- **People recognition:** The analysis of people is based on an idealized contour of an upper part of a human body. With the sliding controller of *People outline* the user can adjust the matching by percentage (typically between 35 and 60%).
Against the recommend *middle* setting of the *Contrast* parameter this setting can be set to *foggy* in case of bad-contrast situations, or to sharp in applications with sharp-cut objects and well-lighted scene.

- **Create statistic:** The sensor can make a dynamic statistical census of each single cell, in order to consider periodical noises, interferences, and to eliminate these influences against singular events.
The mode is qualified for outdoor applications, in which only few changing and objects could be detected.
The census starts after a reset new.

**Disturbance:** Controller to set the size of the disturbance in relation to the min.
size of the object. Default is 50%. Is the size of the disturbances in the alarm area huge (Bushes, trees), then it`s advisable to increase the value. When snow or heavy rain appears in the picture, it`s not necessary to change the value.

**Statistic reduction:** Define the time, where the statistic decreases to zero after no disturbance is recognized. This parameter should only be changed (decreased), when public areas with a lot of traffic are monitored.

## 7.0 Appendix

### 7.1 ASCII-Table:

| character | HEX | | character | HEX | | character | HEX |
|---|---|---|---|---|---|---|---|
| <NUL> | **00** | | + | **2B** | | V | **56** |
| <SOH> | **01** | | „ | **2C** | | W | **57** |
| <STX> | **02** | | - | **2D** | | X | **58** |
| <ETX> | **03** | | . | **2E** | | Y | **59** |
| <EOT> | **04** | | / | **2F** | | Z | **5A** |
| <ENQ> | **05** | | 0 | **30** | | [ | **5B** |
| <ACK> | **06** | | 1 | **31** | | \ | **5C** |
| <BEL> | **07** | | 2 | **32** | | ] | **5D** |
| <BS> | **08** | | 3 | **33** | | ^ | **5E** |
| <HAT> | **09** | | 4 | **34** | | _ | **5F** |
| <LF> | **0A** | | 5 | **35** | | ‘ | **60** |
| <VT> | **0B** | | 6 | **36** | | a | **61** |
| <FF> | **0C** | | 7 | **37** | | b | **62** |
| <CR> | **0D** | | 8 | **38** | | c | **63** |
| <SO> | **0E** | | 9 | **39** | | d | **64** |
| <SI> | **0F** | | : | **3A** | | e | **65** |
| <DLE> | **10** | | ; | **3B** | | f | **66** |
| <DC1> | **11** | | < | **3C** | | g | **67** |
| <DC2> | **12** | | = | **3D** | | h | **68** |
| <DC3> | **13** | | > | **3E** | | i | **69** |
| <DC4> | **14** | | ? | **3F** | | j | **6A** |
| <NAK> | **15** | | @ | **40** | | k | **6B** |
| <SYN> | **16** | | A | **41** | | l | **6C** |
| <ETB> | **17** | | B | **42** | | m | **6D** |
| <CAN> | **18** | | C | **43** | | n | **6E** |
| <EM> | **19** | | D | **44** | | o | **6F** |
| <SUB> | **1A** | | E | **45** | | p | **70** |
| <ESC> | **1B** | | F | **46** | | q | **71** |
| <FS> | **1C** | | G | **47** | | r | **72** |
| <GS> | **1D** | | H | **48** | | s | **73** |
| <RS> | **1E** | | I | **49** | | t | **74** |
| <US> | **1F** | | J | **4A** | | u | **75** |
| <Space> | **20** | | K | **4B** | | v | **76** |
| ! | **21** | | L | **4C** | | w | **77** |
| `` | **22** | | M | **4D** | | x | **78** |
| # | **23** | | N | **4E** | | y | **79** |
| $ | **24** | | O | **4F** | | z | **7A** |
| % | **25** | | P | **50** | | { | **7B** |
| & | **26** | | Q | **51** | | \| | **7C** |
| ` | **27** | | R | **52** | | { | **7D** |
| ( | **28** | | S | **53** | | ~ | **7E** |
| ) | **29** | | T | **54** | | Delete | **7F** |
| * | **2A** | | U | **55** | | | |

## 7.2. Release overview

You find the latest software under *www.norma-systems.de*.

Version 2

| | | |
|---|---|---|
| Firmware | actual version: DOME V1.10<br>Main V2.02 | Date:<br>16.10.2007 |
| PC-Software | actual version: V2.20 | Date:<br>26.09.2007 |

Version 3

| | | |
|---|---|---|
| Firmware | actual version: DOME V1.10<br>Main V3.21 | Date:<br>Januar 2009 |
| PC-Software | actual version: V3.20 | Date:<br>Januar 2009 |

**Upgrade-Instruction**

Sequence of upgrading:

1. Programming firmware *Mainxx.bin* for main cpu .
2. Programming firmware *Domexx.bin* for the interface controller.
3. Installing new PC-software (please uninstall the old version first using Windows *System/Software*)

The programming is performed as described in menu *Servicefunctions* (page 17).

**Important:**
After upgrading the unit the settings of the sensor have to be configured by the new PC-program anew.

## 8.0 Safety Instructions

Observe the following safety instructions for your own safety and to fulfill the device and EMC specifications :

1. Keep the device away from heat sources and direct sun light.
2. Protect the device and the power supply from moisture to avoid the risk of electrical shock and fire.
3. If fluids have penetrated the device, immediately pull the power plug and have the device inspected by an authorized dealer.
4. Do not insert any objects into the device.
5. Never attempt to open the device yourself.
6. Do not subject the device to unusual strain such as strong vibrations and shocks.